

# Active Gravity Offloading System for Deployable Solar Array Structures, Phase I

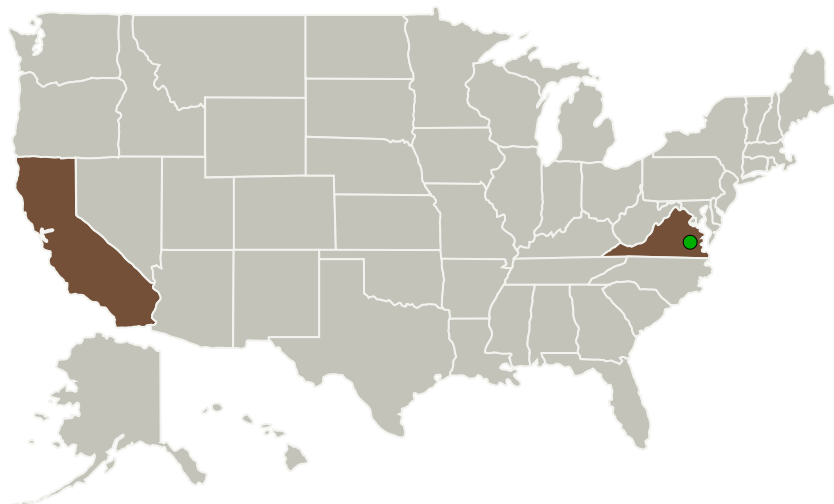
Completed Technology Project (2015 - 2015)



## Project Introduction

Large, lightweight, deployable solar array structures have been identified as a key enabling technology for NASA with analysis and design of these structures being the top challenge in meeting the overall goals of the NASA Space Technology Roadmap. Deployment ground testing of these structures is a uniquely difficult task as the intent is to validate 0g performance and integrity in a 1g testing environment. Existing gravity offloading test support equipment use passive offloading in which offloader tracking is driven by the deployment of the array itself. This approach introduces strong coupling between the test article and the offloader equipment, which affects deployment dynamics and hence accuracy of the simulated 0g response. ATA Engineering proposes to improve existing gravity offloader equipment through the development of an actively controlled system that minimizes the mechanical coupling between the test array and the offloader system. This active system will make use of position sensors to provide data for necessary corrective action as well as analytical models of the offloader and test article to provide predictive capabilities. When paired with actuators on the offloader system, the combined predictor-corrector system will substantially improve ground test 0g simulations. Phase I of this SBIR project will demonstrate increased realism of 0g test conditions by producing demonstration hardware that incorporates the suite of sensors and actuators with an analytical model of the offloader system. In Phase II, an active offloader system will be designed, built, and used to test a state-of-the-art solar array system.

## Primary U.S. Work Locations and Key Partners



Active Gravity Offloading  
System for Deployable Solar  
Array Structures, Phase I

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Organizations Performing Work	Role	Type	Location
ATA Engineering, Inc.	Lead Organization	Industry	San Diego, California
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
California	Virginia

## Project Transitions

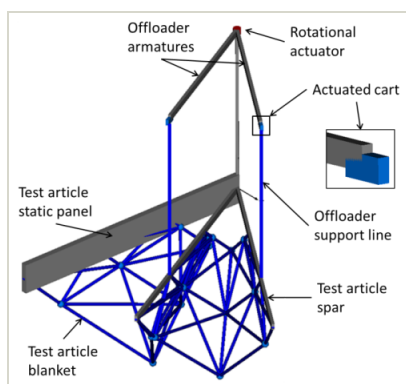
▶ **June 2015:** Project Start

✓ **December 2015:** Closed out

## Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138770>)

## Images



## Briefing Chart

Active Gravity Offloading System for Deployable Solar Array Structures Briefing Chart  
(<https://techport.nasa.gov/image/132702>)

## Organizational Responsibility

## Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

## Lead Organization:

ATA Engineering, Inc.

## Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

## Program Director:

Jason L Kessler

## Program Manager:

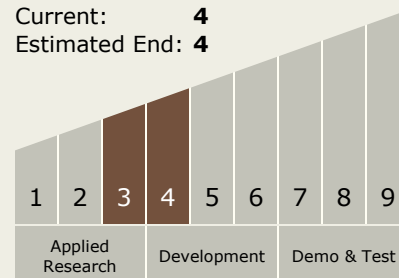
Carlos Torrez

## Principal Investigator:

Cory Rupp

## Technology Maturity (TRL)

Start: **3**  
Current: **4**  
Estimated End: **4**



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## Final Summary Chart Image

Active Gravity Offloading System  
for Deployable Solar Array  
Structures, Phase I Project Image  
(<https://techport.nasa.gov/image/130019>)

## Technology Areas

### Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - └ TX12.2 Structures
    - └ TX12.2.4 Tests, Tools and Methods

## Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System